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ABSTRACT

This document, which is intended to help secondary and postsecondary educators involved in school-to-career programs in Connecticut plan and implement gender equity activities, contains a wide range of specific strategies to encourage female students to consider nontraditional occupations and enroll in the higher-level mathematics, science, and technology courses needed to pursue such careers. The document begins with a description of the research project described in the document and overviews the following topics: (1) the importance of attracting females to nontraditional careers; (2) nontraditional enrollments; (3) obstacles to recruitment; and (4) the current situation which demonstrates a need to strengthen links between secondary and postsecondary education and ensure that females receive the information and preparation needed to pursue nontraditional careers. The remainder of the document consists of descriptions of 10 activities to infuse gender equity. The first six all-female activities are as follows: (1) 1-day gender equity conferences and workshops for females; (2) summer programs; (3) after-school programs and clubs; (4) parent-daughter events; (5) field-trips to science and technology companies and community technical colleges; and (6) World of Technology programs. The four remaining activities, which are classified as mixed-gender activities, are as follows: (1) career fairs or career days; (2) visits to community technical colleges; (3) contacts with employers; and (4) career activities in the classroom. (MN)

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GENDER EQUITY AND SCHOOL-TO-CAREER:

A GUIDE TO STRENGTHENING THE LINKS TO NONTRADITIONAL CAREERS

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INTRODUCTION

The vision for the School-to-Career System in Connecticut is that all students will have the opportunity to connect the learning that takes place within the schools to the needs and demands both in higher education and to the full range of careers offered by the Connecticut economy. By creating a partnership in which schools, employers, unions, state agencies, and community organizations work together, *Connecticut Learns* prepares students for high-wage, high-skill occupations and provides the links to further education and training which are required by such occupations.

The goal of the state's School-to-Career System is to prepare ALL youth for productive employment and further education. However, this goal can only be accomplished if particular attention is paid to the needs of groups who have been locked out of traditional routes to academic and economic success. Both the Carl D. Perkins and the School-to-Work legislation recognize the need to increase opportunities for women to prepare for careers that are nontraditional for their gender. Without planning and specific programs, female students will continue to be shut out of, or opt out of, nontraditional courses in areas like science, math, and technology and will not have the preparation they need to pursue high-wage, high-skill careers in these fields.

School-to-Career courses can be an important means of breaking down stereotypes about "women's work". Students have the opportunity to experience the real world of work and meet women working in science and technology. These opportunities not only provide students with the chance to discover their own interests, but demonstrate that women can, and do, have excellent careers in nontraditional occupations. School-to-Career programs can also establish a link to community technical colleges which provide further educational opportunities in nontraditional areas.

In order to encourage female students to take advantage of School-to-Career opportunities in nontraditional areas, strategies must be developed and adopted which ensure that a broad range of gender equity activities take place within schools, colleges, and communities. The funding and planning of gender equity activities, however, has been modified as a result of recent changes in federal legislation.

The 1998 Carl D. Perkins Vocational and Technical Education Act eliminates the gender equity reserves which were a feature of the Act for the past 14 years. For example, the functions and responsibilities of the state gender equity administrator have been integrated into the state administration and leadership provisions. The new law does not use the term "gender equity" but replaces it with the term "nontraditional training".

The legislation calls for a state plan which must describe how special populations will be served, including displaced homemakers, single parents, single pregnant women, and individuals training for nontraditional employment. The state plan must also describe how nontraditional training activities will be conducted and state leadership funds must support programs for special populations.

Local plans must describe how strategies will be identified and adopted for special populations, how representatives of special populations will be involved, and how funds will be spent to promote preparation for nontraditional training and employment. Local funds must be used to provide students with skills to enter high technology careers and may be used to provide programs for special populations and to support nontraditional training and employment.

These new provisions have eliminated the mandatory reserves for gender equity but retained a focus on serving special populations and promoting nontraditional training and employment. Equity advocates and local school districts are now charged with the task of understanding the new gender equity provisions and developing and implementing gender equity plans and strategies to promote nontraditional occupations.

PROJECT DESCRIPTION

This project is designed to assist educators involved in School-to-Career programs in Connecticut with the planning and implementing of gender equity activities. The report provides a wide range of specific strategies to encourage female students to consider nontraditional occupations and enroll in the higher level math, science, and technology courses in high school that they need to pursue such careers.

For the past ten years, the Vocational Equity Research, Training and Evaluation Center (VERTEC) has been conducting research projects and providing technical assistance to school districts and community agencies across the state with the goal of infusing gender equity into education and training programs. This research examined and analyzed gender equity activities taking place throughout the state in order to identify different strategies and activities to be considered by local school districts, colleges, and regions in developing their gender equity plans.

As part of this research, visits were conducted in at least three school districts in three regions across the state to talk to administrators, teachers, guidance counselors, and students about the obstacles to attracting females to nontraditional programs and the strategies which have proven successful. Administrators and staff from three community technical colleges were interviewed about ways to strengthen the link between colleges and schools as a means of encouraging female students to enroll in nontraditional programs. Successful strategies are presented in two categories: all-female and mixed-gender activities. Specific examples of good practice from particular schools are highlighted in side panels.

BACKGROUND

THE IMPORTANCE OF ATTRACTING FEMALES TO NONTRADITIONAL CAREERS

Despite the high participation of women in the workforce, they are still concentrated in low-paying occupations with few promotion prospects. School-to-Career, in its broadest vision, can open up the educational system and give women more opportunities that will enable them to achieve economic self-sufficiency. In order to accomplish these goals, however, schools and colleges must give female students the opportunity to learn about high-paying careers in math, science, and technology and to develop skills in these areas.

Community technical colleges can play an important role in this process because they offer science and technology programs which lead to high-wage, high-skill jobs in an affordable, local setting. In some states, colleges have developed outreach programs designed to attract female students to nontraditional programs. For example, the Vermont Technical School offers a summer technology camp for 7th and 8th grade students, a Speakers Bureau providing women in nontraditional occupations to talk to classes or groups, and Shadow Days for high school girls (*E. Cunanan and C. Maddy-Bernstein, Working Together For Sex Equity: Nontraditional Programs That Make A Difference, NCRVE Office of Student Services BRIEF, 1993*).

Experience has shown that women are interested in nontraditional occupations when they are actively recruited. Female high school students who are good at math and science and enjoy hands-on technology projects often turn away from higher level classes in these subjects because they are not aware of the kind of nontraditional careers available to them and cannot see themselves in technical or scientific jobs.

Effective outreach strategies send the message that women can do nontraditional jobs, that they will be welcome in school- and work-based learning settings and that they will have female role models *(Non Traditional School-To-Work Opportunities For Young Women, Resource Bulletin, The National School-to-Work Learning and Information Center, 1996).*

NONTRADITIONAL ENROLLMENTS

Looking at the numbers of women obtaining degrees from community technical colleges across Connecticut reveals a very low percentage of graduates in the nontraditional areas of engineering and engineering-related technologies. For the 1997-98 academic year, there were only 38 women out of 236 graduates (14%) receiving associate degrees in engineering-related technologies and only 14 out of 58 (19%) women receiving certificates in those areas. There was only 1 woman out of 14 (7%) graduates receiving associate degrees in engineering (*Degrees Conferred by Connecticut Institutions of Higher Education, 1997-98, Board of Governors for Higher Education, State of Connecticut*).

The low percentage of women obtaining degrees in nontraditional fields is mirrored in the enrollment of females in these courses in community technical colleges. At one college which was visited as part of the research project, there were 7 female students out of a total of 108 in electrical engineering technology. Even in the more traditional medical areas, where the percentage of females enrolled is much higher, recruitment for courses like respiratory and radiation therapy or nuclear medicine has proven difficult. In areas like automotive technology, there are almost no female students enrolled.

The percentage of female students enrolled in Tech Prep courses in high school is low in nontraditional areas as well. In one region, Tech Prep courses in such traditional areas as food service, keyboarding, or early childhood development had high female enrollment, while male students dominated manufacturing, CAD, and technical drawing.

While Tech Prep programs are designed to provide a pathway to further education by awarding community college credit for courses taken in high school, there is often only a small percentage of these graduates who actually go on to enroll in that college. At one community technical college visited, there were 697 high school students enrolled in Tech Prep programs, but only 25 (3.5%) of these students were admitted to the college that awarded them credits after graduation from high school.

Obstacles to Recruitment

Interviews with college administrators and faculty indicated several obstacles to the recruitment of females to nontraditional programs. First, stereotypes about "women's work" are still strong and can be difficult to overcome, particularly in areas like automotive engineering where there are so few working women. One faculty member in this field, who has struggled to recruit women to his program, pointed out that even when women are attracted to the course, they often meet resistance and discouragement from friends and family.

Second, the lack of information is a problem. Because high-tech industries have undergone rapid changes in recent years, many people are not aware of the labor market for high-skill technical employees and the kinds of training programs in these areas that are available at community technical colleges. Despite the high salaries and promotion prospects of many technical occupations, most recent high school graduates, both male and female, are unaware of the opportunities available in these fields.

Third, even for women interested in enrolling in nontraditional programs, lack of academic preparation in high school can be a disadvantage. In general, most community technical college students do not come directly from high school. At one of the colleges visited, the average age of students was 27, which indicates that many students have considerable work experience before deciding to go back to college. For women who have been out of school for a long period of time, one obstacle to applying to a technical program is the lack of the high school math and science classes that are required for admittance.

For students interested in technical or medical programs, the need to take algebra and lab sciences often means one to two years of remedial work before being admitted. The Enrollment Officer interviewed at one college estimated that 65% of new students had to take some remedial classes. The community technical colleges visited offered extensive tutoring programs and support for students trying to upgrade their math and science skills, but the lack of training in high school is clearly an additional disadvantage for women interested in nontraditional programs.

Finally, according to high school staff interviewed, often parents are obstacles in getting students to consider attending community technical colleges. Many parents see four-year colleges as the only path to good careers for their children, even when the costs are prohibitive. Clearly parents need more information about the programs offered in community technical colleges. Further, any activities designed to encourage female students to consider nontraditional programs will be more successful if parents are involved.

The Current Situation

The current situation clearly demonstrates a need for strengthening the links between secondary and post secondary education and ensuring that females have the information and preparation they need to pursue nontraditional careers. Because higher level math and science classes are required, gender equity activities need to start early enough to influence girls in their choice of classes before they reach their junior and senior years.

Programs in elementary schools can begin challenging stereotypes about "men's" and "women's work". Middle school programs can influence girls at a very crucial time, when research has shown that girls tend to start turning away from math, science, and technology. High school programs for freshman and sophomores can create opportunities to meet nontraditional role models and explore nontraditional careers.

When we visited Connecticut's regional School-to-Career Partnerships to discuss the need to develop a gender equity plan, many of those involved in School-to-Career understood the problems with the current situation, but were unsure of what steps they could take to attract more girls to nontraditional programs. This report highlights a range of ideas and strategies that can be implemented, from elementary school through high school to college programs, and includes examples of successful initiatives from across the state.

STRATEGIES TO INFUSE GENDER EQUITY

Strategies designed to encourage girls to consider nontraditional careers and enroll in classes in math, science, and technology fall into two major categories:

- First, there are activities which are organized for females only and designed to give girls a chance to learn about careers, meet female role models, and/or interact with other girls in an all-female environment. They can be short-term conferences or ongoing classes and activities.

- Second, there are activities with both male and female students, where the effort is made to ensure that nontraditional role models are presenters and at least half the participants are female. These activities challenge stereotypes about what women can do and all students have a chance to learn about careers in math, science, and technology.

ALL-FEMALE ACTIVITIES

All-female activities can be a valuable tool in breaking down stereotypes about what careers are appropriate for women. Exposure to the real world of work and to women working in nontraditional occupations is important to career and skill development. Without these kinds of interventions, the overwhelming majority of girls will follow the traditional path and miss the technical opportunities of the 21st century. Giving girls the chance to challenge stereotypes in an all-female environment is a very powerful tool and an important part of an overall gender equity plan.

1. One-Day Gender Equity Conferences and Workshops for Females

Purpose:

Gender equity conferences should be designed to expose female students in middle and high schools to the benefits of nontraditional occupations by meeting female role models who work in these fields. Students should be given the opportunity to see and try the kind of work involved, ask questions, and think about the kinds of jobs they would be interested in within these fields. Such conferences can strengthen School-to-Career programs by giving female students the chance to learn more about nontraditional occupations. If they take place at community technical colleges, they can strengthen the link between schools and colleges and encourage girls to consider nontraditional programs in these institutions.

Organization:

Conferences need to be carefully organized to make the best use of limited time. While activities can be planned for the whole group of students, the focus should be on smaller workshops where girls will have a chance to meet and interact with role models. The conference can begin with a keynote speaker addressing everyone, but lectures to the whole group should be kept brief. Alternatively, if there is a meal planned, students could first attend workshops, hear a keynote speaker during the meal, then break up to attend another workshop. In planning conferences it is important to follow these guidelines:

- Give students a chance to attend at least two workshops, since many will not necessarily get their first choice and they need to be exposed to a wide a range of occupations.

- Invited presenters do need a reasonable amount of time to carry out activities, so schedule at least 45 minutes for workshops and some travel time for the students to get to the right room.

Guidelines for Keynote Speakers:

Keynote speakers should address the general issues facing women in the workforce. They should encourage girls not to limit their ambitions or accept stereotypes about what women can do. Ideally, a charismatic woman in a nontraditional field could discuss her career path, job experience, and the kinds of obstacles she faced. They should avoid presentations of statistics or detailed information and limit the lecture to 15 minutes.

Target Groups:

The target group should be directly linked to the conference goals. If the goal is to attract students to community technical college programs, juniors and seniors might be the best audience. If the goal is to expose students to high school opportunities, freshman and sophomores are a better target group although middle school students could benefit greatly as well. If participants are younger, planners need to ensure that presentations are modified to fit the attention span and interests of younger students.

Presenters:

When recruiting role models, select women working in nontraditional areas such as math, science, law enforcement, and engineering. A conference can be organized around the School-to-Career career clusters and include the range of different career possibilities. If occupational areas are included which are traditionally dominated by women, such as the medical field, care should be taken to ensure that presenters are not limited to nurses, for example, but include technical jobs like EKG technician or radiological technician.

If given a choice, it may be better to have younger women as role models and speakers, regardless of their level of seniority in their company—students, particularly younger ones, can relate better to someone who can remember being a high school student.

Content Of Workshops:

Workshops should stress hands-on activities rather than lectures. A brief hands-on activity can greatly enliven a workshop and keep students engaged. These activities can range from simply bringing in equipment (surveyors bring in measuring instruments) or bringing in uniforms and giving students the chance to see and try them out, to doing short scientific experiments or trying computer programs. Presenters need to think about including a short activity that would give students a sample of what they do.

At a gender equity conference at Quinnebaug Community Technical College, a female engineer working at a water treatment plant shared her experiences with high school students. She talked about how the plant was organized and the kind of problems which she had to solve. While it was difficult to design a hands-on activity based on her work, she did bring in samples of dirty and clean water to pass around so that the students could see the results of her work.

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Occasionally presenters have standard material that they present to a variety of different audiences. While this can be ideal, organizers should discuss the content with them in advance. Presentations organized for adults are often too detailed or too statistical to interest students. In addition, presentations can sometimes include advertising for the company products or services and contain too little general information about what the presenters actually do on the job and why they chose their career.

Organizers need to talk to presenters ahead of time and establish clear guidelines about how to organize the presentations and to discuss the content of the presentations. Some presenters have not been in a school or talked to high school (let alone middle school) students since they were in school. Remember that they may not know how students act, what engages their attention, and how to relate to them. Presenters should be encouraged to take the following approach:

- Describe personal experiences, rather than presenting a general picture. Explain how they ended up with their jobs. Discuss how they felt about math, science, and technology when they were in high school or middle school. What kinds of problems or obstacles did they have to overcome?

- Discuss what it is like to work on their jobs, what is a typical day, what kind of skills you need, what they like or dislike about their work.

- Discuss how much money they make, the promotion prospects in their industry, what kind of benefits they get, and what kind of working conditions they face.

Presenters may not include a discussion of salary and promotion prospects unless they are encouraged beforehand. Yet one of the major points of having students meet nontraditional women in the workforce is to show them that not only can women do these kind of jobs, but they can make better salaries, receive better benefits, and have better promotion prospects than in traditional jobs for women.

Since none of the workshops will be that long (usually they are scheduled between 45 minutes and an hour), presenters need to know the essential points they should cover and discuss the kinds of activities they can provide with organizers before the conference. The more preparatory work with presenters, the more likely they will succeed in engaging students and giving them a real chance to learn about career opportunities.

Location Of Conferences:

While conferences can take place in a variety of venues, hosting them at community technical colleges can be an advantage, particularly with the cooperation and participation of the college staff. Because the link between schools and colleges can be weak, holding gender equity conferences at the colleges gives students an opportunity to visit and a chance to see the kinds of programs available in nontraditional areas, particularly if college staff members are presenters as well. For example:

At a gender equity conference at Gateway Community College, a female engineer from a high-tech company who was working on her Ph.D., discussed the academic preparation needed in her field. The students seemed to find the concept of a M. A. or a Ph.D. very remote, but when asked whether she liked math in school, she laughed and admitted she hated it in middle school and only began to get interested in high school. The students immediately perked up and began to pay more attention.

- Workshops run by college staff in nontraditional areas can be held in labs and classrooms where such courses are given – students can do hands-on activities using college computers or lab equipment.

- If college staff include female teachers and if female college students can assist with presentations, girls will be given an opportunity to meet important role models and see not only the kind of programs available at the college, but that females are participating in these programs.

Other locations can also be used for gender equity conferences, depending on how many schools are participating and how wide a region is covered. Conferences can take place at a particular school, although they would likely be on a smaller scale and involve fewer workshops. However, conferences held at a school can give female students a chance to play a leadership role by helping to organize the conference. For example, one conference at a high school was organized and run entirely by junior and senior female students who contacted presenters, set up all the workshops, and acted as guides.

Preparation and Follow-Up in the Schools:

While a one-day conference can introduce girls to the possibilities of nontraditional occupations, it can have a much greater impact if it is integrated into the school's gender equity activities and is part of a gender equity plan that is not limited to the conference. Both preparations before the conference and follow-up activities are crucial.

- Before the conference, teachers can conduct gender equity activities designed to make all students aware of the challenges that women face in the workforce. The differences in salaries and promotion prospects of traditional as opposed to nontraditional occupations, and the prevalence of stereotypes about the kind of jobs women are capable of doing are just two of the subjects that can be addressed. There is a wide range of teaching material available, and these kinds of activities can be carried out in academic classes or as part of a career curriculum. Both boys and girls can benefit greatly from discussions about the realities of the workplace and the need to fight stereotypes.

- After the conference, female students can be asked to report back to their classes about what they saw and learned and their impressions of the different kinds of careers. It can be connected with math, science, and technology education classes or integrated into career planning activities in the school.

At a conference at Quinnebaug Community Technical College, a female engineer who received an associate's degree on a scholarship from her company, talked about working conditions (she was the only female engineer in this plant). When asked about her salary, she told the students she was already earning $70,000 a year despite having only a few years of experience. She may not have mentioned this if not asked the question, but she was happy to discuss it and the students were impressed.

2. Summer Programs

Programs designed to give girls a chance to learn about nontraditional careers can be offered as summer programs. These programs have the advantage of allowing time for hands-on activities as well as field trips to local employers. There are a number of summer programs which are offered by private organizations but the opportunities to participate are limited because they are often scholarship-based programs.

If community technical colleges offer programs to high school students in the summer, they can provide opportunities for female students to explore math, science, and technology and strengthen the link between the colleges and schools. Giving high school students a chance to see the wide range of technology programs available in local colleges and the increasing job opportunities in these areas could improve college recruitment while encouraging girls to consider nontraditional careers. While all-female programs would be ideal in terms of gender equity, mixed-gender programs can also be very valuable. This kind of program is beneficial for all students, particularly if parents are encouraged to participate and given the chance to see the kind of careers that are available to graduates of community technical college programs.

Manchester Community Technical College's 1995 Technology Institute was a six-week summer program which involved hands-on activities in different technology labs. The college worked closely with high school staff to ensure that 50 percent of participants were female. The program included trips to colleges offering four-year engineering programs and local technology companies. College staff stressed the importance of emerging technologies and the increasing need for skilled workers in these fields.

3. After-School Programs and Clubs

After-school programs can provide girls an opportunity to learn about science, math, or technology in an informal atmosphere. An all-female format gives the girls a chance to interact with each other and with technology without the social pressure boys can add to the environment. This pressure was evident in our observation of technology education classes, where boys often took more than their share of the equipment and attention of the teacher *(Silverman and Pritchard, Building Their Future: Girls In Technology Education In Connecticut. CWEALF, September, 1993).*

Middle schools can play an important role in encouraging girls to pursue nontraditional subjects at an age when interest begins to decline, even among girls who have shown real talent and ability in math, science, and technology. Since all girls are required to take technology education in middle school, a club that provides interested girls with the opportunity for hands-on projects can be an excellent strategy to encourage them to continue nontraditional classes in high school. Female math, science, or technology education teachers can be wonderful role models if they are willing to organize such activities. Mini-grants to teachers can encourage the formation of such clubs.

While many high schools do provide opportunities for their students to explore math, science, or technology in after-school programs, without any effort to ensure that girls are participating, they tend to make up only a small fraction of the enrollment. Since so few girls take technology education in high school, a special effort needs to be made to encourage girls to participate. An all-girl format allows girls to work with technology and explore math and science concepts without the added pressure of competing and interacting with boys.

Danbury Public Schools are providing kits from the Lego company for after-school technology programs that involve computer-aided design (CAD) at the middle school level. The Lego kits provide students with the materials to build a number of different projects. Some sections are reserved for girls and some are mixed-gender.

Some high schools have clubs primarily involved with using computers, sometimes setting up websites or other internet activities but enrollment tends to be dominated by boys. Computer clubs can provide opportunities for girls to learn about the growing number of careers in the computer field and to improve their computer skills. Teachers organizing such activities should be aware of the need to recruit girls and ensure that they have an equal chance to participate, or form an all-girls club to encourage their participation.

4. Parent/Daughter Events

In our visits to schools around the state, School-to-Career Coordinators mentioned that parents can often be an obstacle to the recruitment of their daughters to nontraditional programs. Besides being influenced by negative stereotypes, many parents are not aware of the kind of careers available in math, science, and technology and the salary and promotion prospects of such careers.

Parent/Daughter events can give both female students and their parents the chance to learn about career opportunities in nontraditional fields. Programs at the middle school level can influence students before decisions are made about pursuing higher level math and science classes in high school.

Middle school programs can bring female role models in nontraditional occupations to the school to talk about their career decisions and experiences. By having such an event in the evening, both parents and students can attend and have the opportunity to talk with women in a wide range of different nontraditional fields.

Parent/Daughter events can also be organized at the high school level, particularly for students who are at the point of making decisions about what classes to take and considering School-to-Career programs. Parents are often unfamiliar with the structure and advantages of School-to-Career programs. An event that presents both parents and students with information about School-to-Career programs while encouraging girls to consider nontraditional options is very valuable.

The participation of community technical colleges in such an event helps strengthen the link between schools and colleges, since there is a common perception on the part of parents that only four-year colleges can provide good career opportunities for their children. In our visits to high schools, many School-to-Career Coordinators reported that parents were not aware of the kind of programs and opportunities provided by community technical colleges. The participation of college staff in such areas as math, science, and technology in a Parent/Daughter event at the high school can help to improve this relationship.

Shelton Intermediate School holds an annual Parent Daughter Career Night where women from a wide range of nontraditional fields come to the school. There are usually 12-15 speakers, from helicopter pilots to television personalities, who start the program with short speeches about their personal experiences and their jobs. Then the speakers move to small booths set up to allow for some hands-on activities and the chance to talk with students and parents and answer questions.

5. Field Trips to Science and Technology Companies and Community Technical Colleges

Research has shown that middle school is a critical period for girls to develop interest in math, science, and technology. Activities which allow them to interact with female role models and explore nontraditional worksites are very valuable. If field trips to science and technology companies are organized for all-female groups, companies need to ensure that female employees are involved and that they give the girls a chance to see what is involved in their jobs. These trips can be integrated into the guidance curriculum in middle school which can include career exploration activities at the school before and after the trip.

Female high school students can benefit from trips to community technical colleges which allow them to participate in math, science, and technology classes. This kind of activity not only gives students a chance to learn more about the opportunities available at local colleges, but gives them a chance to meet female college students and staff.

New Fairfield Middle School offered Industry Tours for a total of 19 girls in three separate trips. The tours included visits to an engineering firm, a hands-on technology workshop at another company, and a visit to the local vocational-technical high school. The three groups of girls were chosen by teachers to take part in these tours based on ability levels and interest in math, science, and technology.

6. World of Technology Programs

Since our original study of girls in technology education in Connecticut *(Building Their Future, 1993 and 1994),* CWEALF has been working with a number of school districts to develop and implement the *World of Technology* program, an activity-based technology education course with sections targeted to female students. Our research found that being one of only a few girls in technology education classes was a serious deterrent for most girls in choosing technology education as an elective in high school. By providing the option of an all-female section, *World of Technology* courses have succeeded in attracting many girls who would not otherwise have taken technology education.

This course provides students with experiences in the application of technology and an understanding of its impact on the individual and society through a curriculum that explores real world problems. Information about a wide range of technical careers is presented and mentors from industry participate in class activities and discuss careers with the students. Students are actively involved in projects that use computers, tools, materials, problem-solving skills, and the design process.

A study of current *World of Technology* courses in Manchester, Waterbury, and Naugatuck school districts found that roughly 64% of female students in these classes felt that there is a difference in the classroom without male students. Further, the female students perceived that difference as having a positive effect on the classroom environment. Classroom observations have shown that in all-female classes, students work well in groups, help each other, and are responsive to lectures. While this curriculum also works well with all-male or mixed-gender groups, the all-female sections have proven popular with female students and led to an increased enrollment of girls in technology education classes.

Thirty students from Seymour High School visited Naugatuck Valley Community-Technical College as part of the School-to-Career Gender Equity Initiative. These students sat in on physics, math, and biology classes and participated in a lunch seminar with college staff.

The cooperation and support of guidance counselors is critical in introducing such a program, but once established, the distribution of brochures or flyers, word of mouth, and personal recommendations also bring female students into the classes. While female students can also take a mixed-gender section of the course, the option of an all-female section has been an important part of the success of the program in recruiting females.

New Fairfield Middle School offered a Career Day which consisted of 29 speakers for students in all three grade levels. During the initial interview process for this event, efforts were made to find females who worked in nontraditional occupations. These women made up 76% of the speakers at the Career Day.

Mixed-Gender Activities

The second type of gender equity strategy involves activities with both male and female students, where the effort is made to ensure that nontraditional role models are presenters and at least half the participants are female. These activities challenge stereotypes about what women can do and all students have a chance to learn about careers in math, science, and technology.

While some of these activities are already taking place in many schools and colleges, without an effort to organize them with the explicit intention of ensuring female participation, they are unlikely to contribute to the goals of gender equity. Organizers must work with school counselors and staff to identify female students who are likely to benefit from such activities and must make the effort to find nontraditional female role models who are willing to participate.

1. Career Fairs or Career Days

While most schools traditionally have some form of Career Fair or Career Day during the school year, there are many different models and they can serve a number of different purposes. For high schools, Career Fairs provide an opportunity for older students to learn about different careers, usually by visiting booths to talk with representatives from local businesses and colleges. These activities are geared to students who are already interested in specific careers and want detailed information.

For such Career Fairs, it is important for schools to talk to the businesses and colleges to ensure that their representatives include women, particularly in nontraditional areas like manufacturing and engineering. If colleges are participating, sending female faculty is very important, particularly in math, science, and technology areas. Colleges can also send some of their female students who are likely to be able to relate well to the high school girls. It is important that colleges not only send recruiters but also include female role models in nontraditional areas.

Career Days, as opposed to targeting older students, can be designed to allow more career exploration and involve middle school or younger high school students. Rather than having booths where individual students can ask questions, such programs can invite speakers to make brief presentations and then break up into smaller groups with opportunities for hands-on activities and questions. The inclusion of female role models from local businesses allows both male and female students to see that women are successfully pursuing careers in nontraditional areas.

If such programs are offered in the evening, parents can be invited along with stu-

dents. While the Career Fairs would not be limited to information about careers in math, science, and technology, by ensuring that women are presenters in nontraditional areas, female students and their parents can be encouraged to consider such careers and learn about the math, science, and technology education classes students need to take if they are interested in these areas.

2. Visits to Community-Technical Colleges

Since many high school students are unfamiliar with the kind of programs in math, science, and technology that are offered at community technical colleges, giving them the opportunity to visit local colleges can be an important step in encouraging girls to consider nontraditional programs. Trips which include visits to classes and labs and opportunities for hands-on activities are ideal.

Having college staff (particularly female staff) invite high schools students to explore math, science, or technology in workshops strengthens the link between high schools and colleges. At the same time, gender equity goals can be met by working with high school counselors and staff to identify interested female students and ensuring that at least half the participants are female.

Colleges can also offer Subject Days which can be organized specifically for high school students or can be open to the general public. This focus allows students to explore more fully a subject area they are interested in pursuing after high school.

Open Houses are another way of inviting high school students to visit community technical colleges. Open Houses can be organized around subject areas, such as technology or allied health, giving students a chance to visit classes and labs. By working with the schools, colleges can try to ensure that at least half the students invited to participate in an Open House event are females. Inviting female college students to act as hosts is also a good idea.

3. Contacts with Employers and Work Experience

One of the best ways to break down stereotypes about "women's work" is for students to see women in nontraditional occupations at their workplace and have the chance to experience the real world of work. Trips to companies and opportunities for shadowing and internships are usually integrated into School-to-Career programs. School-to-Career programs can contribute to gender equity if female students are encouraged to participate in exploring nontraditional careers. As with all the activities for mixed-gender groups, efforts have to be made to identify girls who are interested in these areas and make sure they can take advantage of these opportunities.

Visits To Science and Engineering Companies

Naugatuck Valley Community-Technical College offers Subject Days which are open to the general public. These include Aviation Day, Math Day, Astronomy Day and Meteorology Day where college staff and outside speakers discuss current scientific issues and give participants a chance to do hands-on activities. Astronomy Day, for example, was offered from 10am to 5pm on a Saturday and included talks about the discovery of planets and the chance to use telescopes, as well as many demonstrations and exhibits.

Gateway Community Technical College offered four Open Houses in different subject areas, including technology, allied health, business and human services. The Technology Open House allowed visits to automotive, biosciences, engineering (electrical and mechanical) and graphics labs and classes. The program was targeted to junior and seniors from local high schools.

While many School-to-Career programs include field trips by high school students to high-tech companies, without specific efforts to recruit females, male students often dominate these activities. Since the companies give students a chance to see the kind of work being done and sometimes to try hands-on activities, these trips are an excellent way to encourage girls to learn more about these careers.

Most companies have female employees who are willing to meet with high school students during these visits and talk about their own experiences. Meeting such role models and seeing what they do at work can be an eye-opening experience for both male and female students. Such trips can also be very useful for middle school students who have not explored their areas of interest.

Shadowing and Internships

Most schools include opportunities for shadowing and internships as part of their career exploration or School-to-Career programs. If shadowing is part of the career exploration process, it can play an important role in encouraging girls who are interested in nontraditional areas to learn more about these kinds of careers. If interest inventories identify 9th grade girls who like math, science, or technology, these students can be offered an appropriate shadowing experience as sophomores and internships as juniors and seniors in these nontraditional fields.

In order to organize these kind of experiences, a system for identifying appropriate female candidates needs to be in place and school staff must work with local employers to find placements with role models willing to encourage girls in these careers. Many internship programs include mentoring but specific efforts need to made to ensure that female mentors in nontraditional fields are available for girls who want these kind of internships.

4. Career Activities in the Classroom

Efforts to encourage girls to consider nontraditional careers are not likely to succeed if they are only organized for high school juniors or seniors. By their junior year, many high school students have already made decisions about what classes to take that will limit their ability to pursue careers in math, science, and technology. A comprehensive gender equity plan which includes elementary and middle school activities should be the goal so that female students are exposed to nontraditional careers as early as possible.

At each level, there are appropriate activities which can expose younger girls to the range of careers available to them and give them a chance to meet nontraditional role models. At the elementary level, career exploration activities can be integrated with nontraditional subjects, such as math or science, to give all students a chance to learn about careers in these fields. Gender equity can be included as part of this curriculum. Such lessons can be combined with visits from professionals in those fields recruited from local businesses, parents, and the community. At the middle school level, career activities also can include a gender equity component. Most middle schools have a guidance curriculum including some career exploration and this could be combined with discussions of gender equity and videos about nontraditional careers for women.

The Branford school system had a pilot project which involved all 4th grade students in three elementary schools. As part of the science curriculum, students had five lessons about scientific careers, including one session on gender equity. They learned about different careers including zoologist, botanist, chemist, etc. Students then picked one career and did their own research using computer web sites and library resources to find out about the job and educational requirements for that career. The project culminated with posters made by the students in the form of job advertisements for their chosen career.

Conclusion

For the past four years, VERTEC staff have been working with districts across the state to help them develop gender equity plans and implement gender equity activities as part of their School-to-Career system. As documented in this report, many excellent activities have been initiated. However, recent changes in the Carl D. Perkins Act require local districts and regions to take an active role in developing a comprehensive approach to serving special populations and encouraging nontraditional training and careers.

The goal of this report is to highlight the kinds of ideas that districts need to incorporate in a gender equity plan which meets the needs of female students at all levels. The goal of a comprehensive plan should be to provide a core of all-female activities, including both ongoing activities such as after-school clubs and annual events such as workshops, conferences, or field trips. Beyond these core activities, the plan should recommend steps to infuse gender equity into mixed-gender activities.

The many school districts and colleges who cooperated in this research project provide evidence of the wide range of strategies available to those developing a gender equity plan. We thank them for their help and hope that their initiatives will be an inspiration for the development of comprehensive gender equity plans by all school districts and regions across the state.